



The role of interactions in a world implementing adaptation and mitigation solutions to climate change

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Abstract:

The papers in this volume discuss projections of climate change impacts upon humans and ecosystems under a global mean temperature rise of 4 degrees C above preindustrial levels. Like most studies, they are mainly single-sector or single-region-based assessments. Even the multi-sector or multi-region approaches generally consider impacts in sectors and regions independently, ignoring interactions. Extreme weather and adaptation processes are often poorly represented and losses of ecosystem services induced by climate change or human adaptation are generally omitted. This paper addresses this gap by reviewing some potential interactions in a 4 degrees C world, and also makes a comparison with a 2 degrees C world. In a 4 degrees C world, major shifts in agricultural land use and increased drought are projected, and an increased human population might increasingly be concentrated in areas remaining wet enough for economic prosperity. Ecosystem services that enable prosperity would be declining, with carbon cycle feedbacks and fire causing forest losses. There is an urgent need for integrated assessments considering the synergy of impacts and limits to adaptation in multiple sectors and regions in a 4 degrees C world. By contrast, a 2 degrees C world is projected to experience about one-half of the climate change impacts, with concomitantly smaller challenges for adaptation. Ecosystem services, including the carbon sink provided by the Earth's forests, would be expected to be largely preserved, with much less potential for interaction processes to increase challenges to adaptation. However, demands for land and water for biofuel cropping could reduce the availability of these resources for agricultural and natural systems. Hence, a whole system approach to mitigation and adaptation, considering interactions, potential human and species migration, allocation of land and water resources and ecosystem services, will be important in either a 2 degrees C or a 4 degrees C world.

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Resource Description

Exposure : ☐

weather or climate related pathway by which climate change affects health

Air Pollution, Ecosystem Changes, Extreme Weather Event, Food/Water Quality, Food/Water Security, Food/Water Security, Glacier/Snow Melt, Human Conflict/Displacement, Precipitation, Sea Level Rise, Temperature

Air Pollution: Ozone

Climate Change and Human Health Literature Portal

Extreme Weather Event: Drought, Flooding, Wildfires

Food/Water Quality: Other Water Quality Issue

Water Quality (other): Ocean acidification; Saltwater intrusion

Food/Water Security: Agricultural Productivity, Fisheries, Food Access/Distribution, Nutritional Quality

Temperature: Fluctuations

Geographic Feature: 

resource focuses on specific type of geography

Arctic, Desert, Ocean/Coastal, Other Geographical Feature

Other Geographical Feature : Forests

Geographic Location: 

resource focuses on specific location

Global or Unspecified

Health Impact: 

specification of health effect or disease related to climate change exposure

Infectious Disease, Morbidity/Mortality

Infectious Disease: Foodborne/Waterborne Disease, General Infectious Disease, Vectorborne Disease

Foodborne/Waterborne Disease: General Foodborne/Waterborne Disease, Schistosomiasis

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Mitigation/Adaptation: 

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Model/Methodology: 

type of model used or methodology development is a focus of resource

Methodology

Resource Type: 

format or standard characteristic of resource

Research Article, Review

Timescale: 

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content